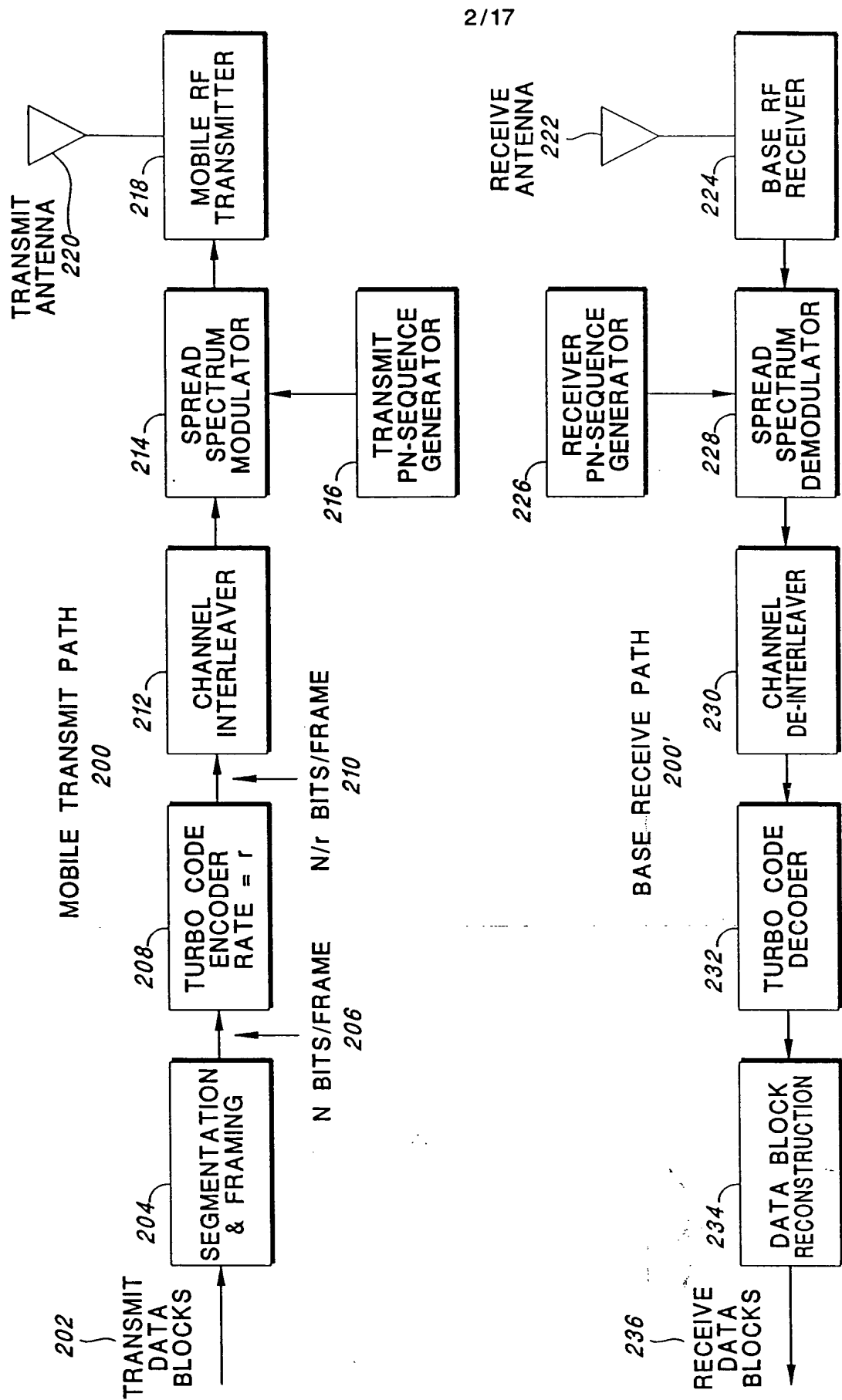


BLOCK DIAGRAM OF A DIRECT SEQUENCE CDMA DIGITAL CELLULAR MOBILE TRANSMITTER AND BASE RECEIVER

FIG. 1



EXAMPLE OF A CDMA COMMUNICATIONS LINK USING TURBO CODES

FIG. 2

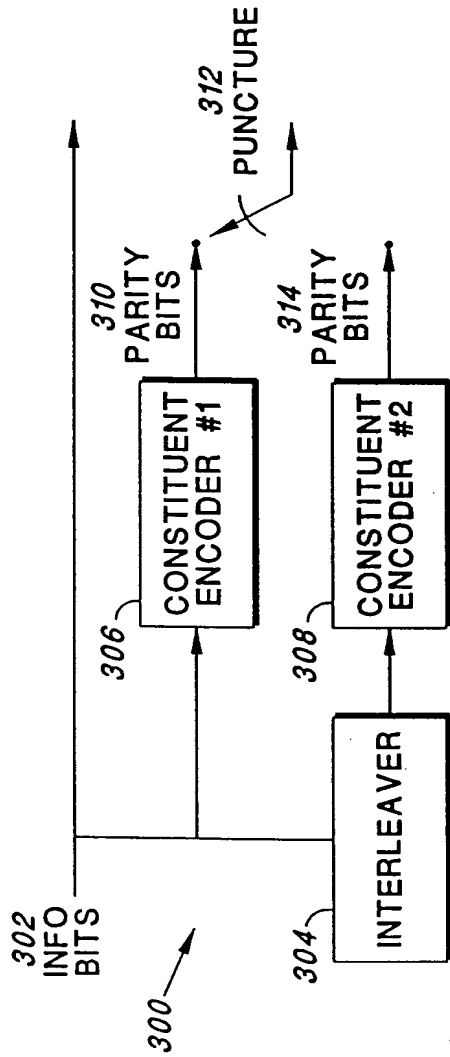


FIG. 3
GENERIC TURBO CODE ENCODER BLOCK DIAGRAM

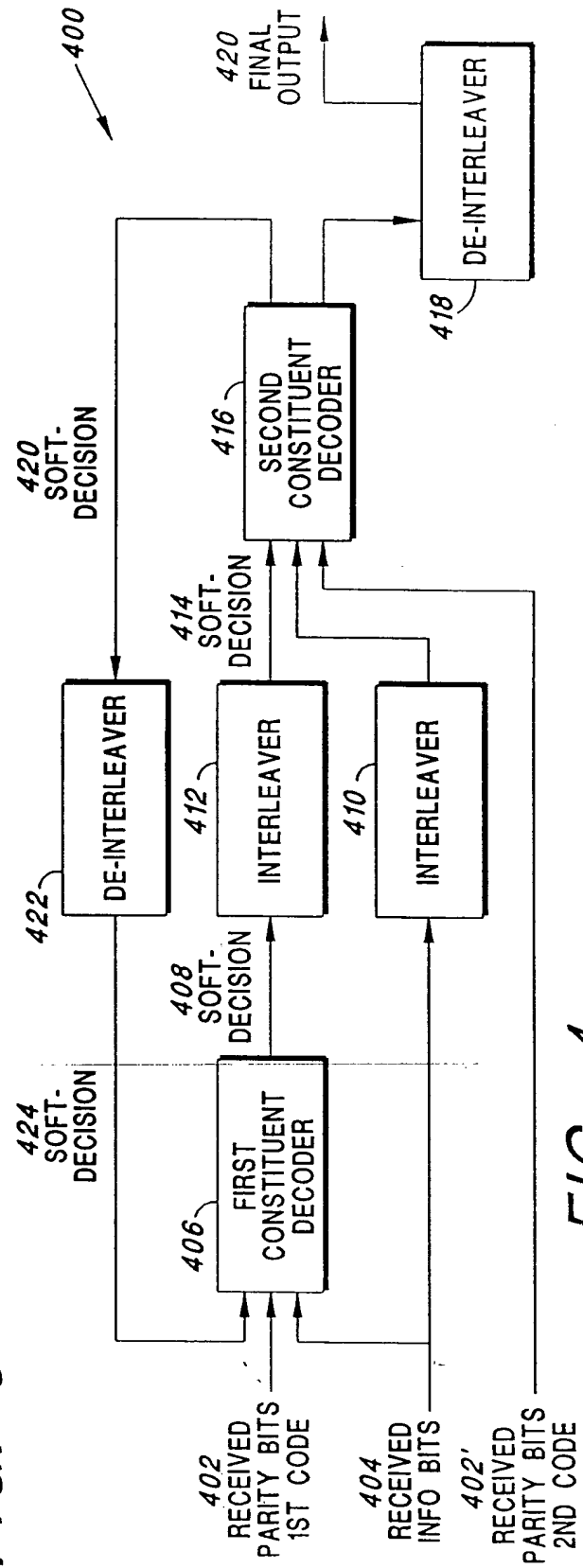
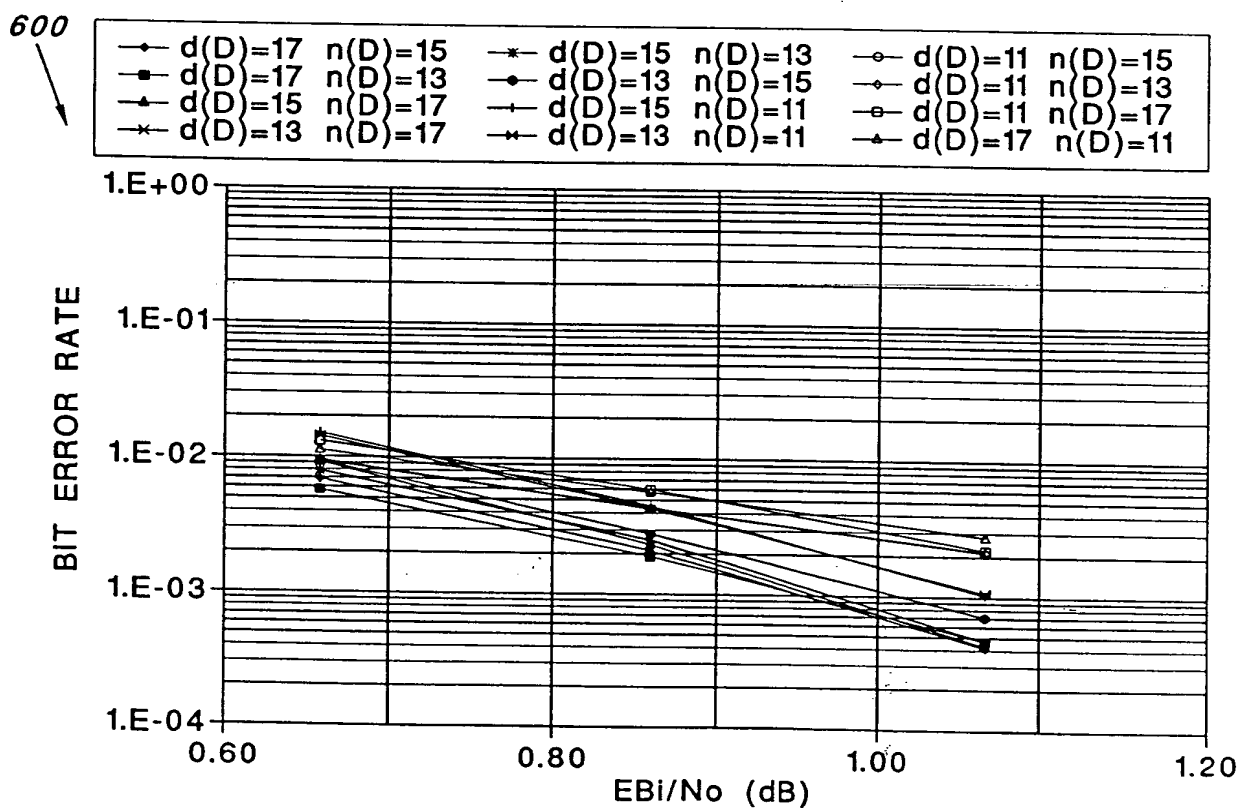
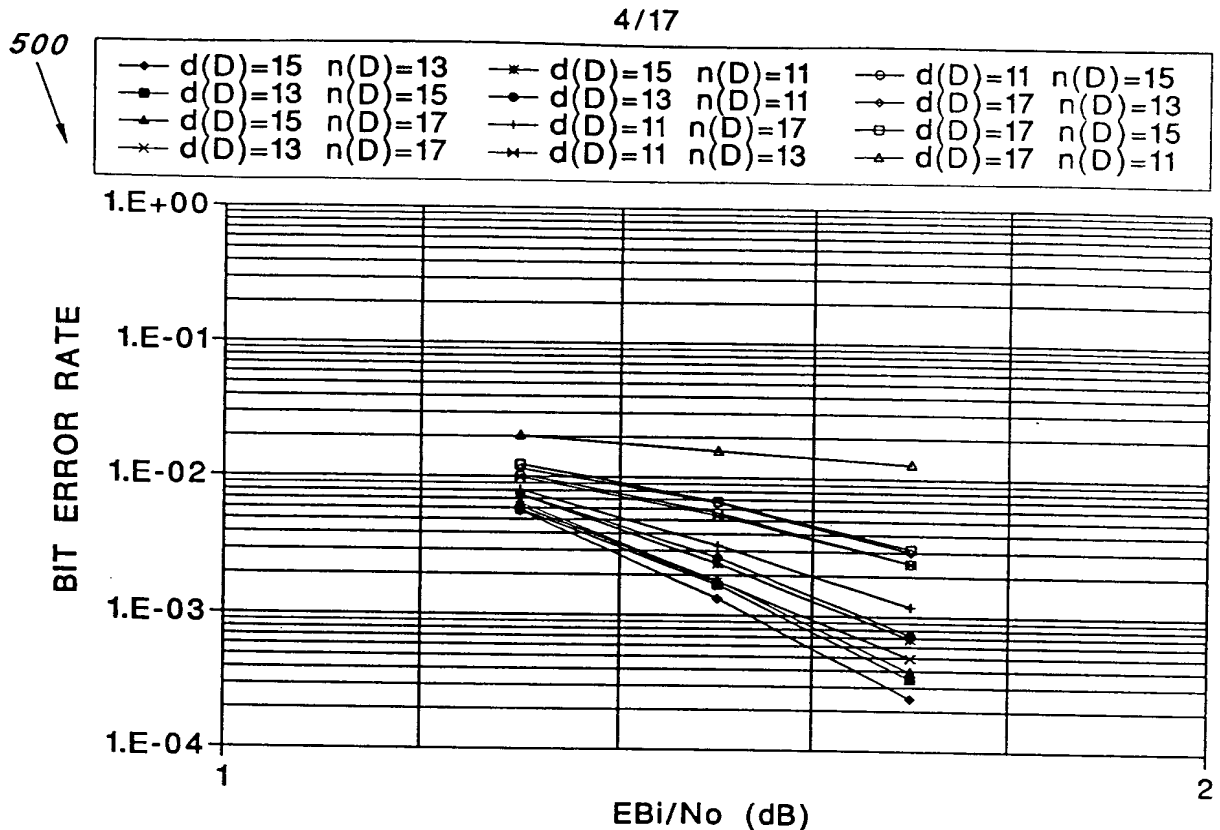


FIG. 4



700

5/17

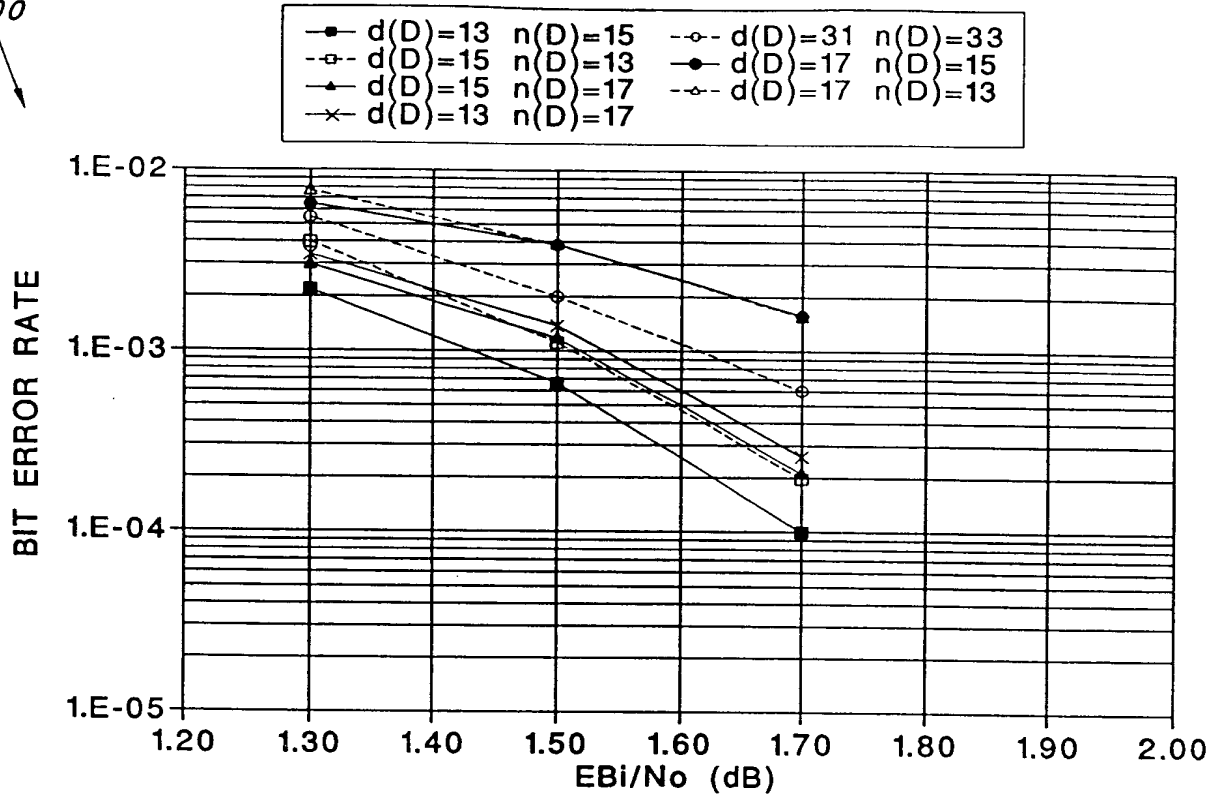


FIG. 7 SELECTED RATE 1/2 TURBO CODES ON AWGN CHANNEL, 512 BIT FRAME SIZE

800

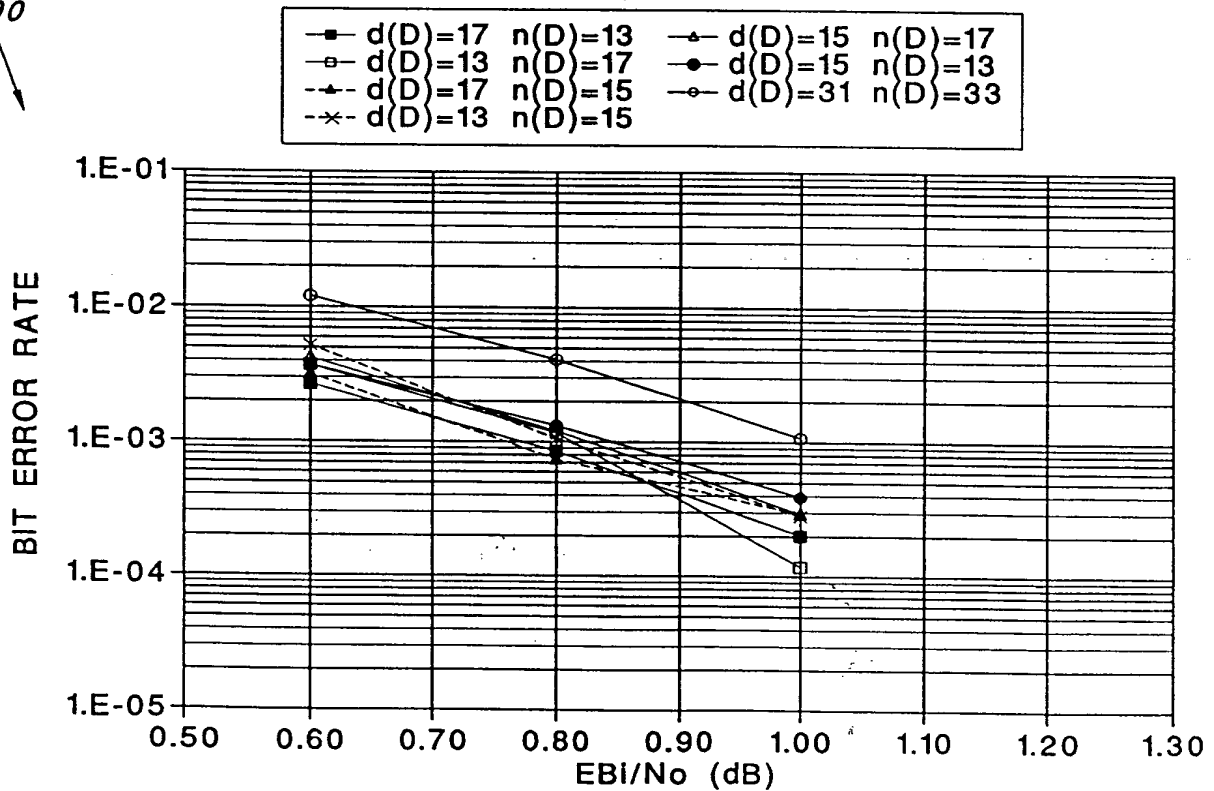


FIG. 8 SELECTED RATE 1/3 TURBO CODES ON AWGN CHANNEL, 512 BIT FRAME SIZE

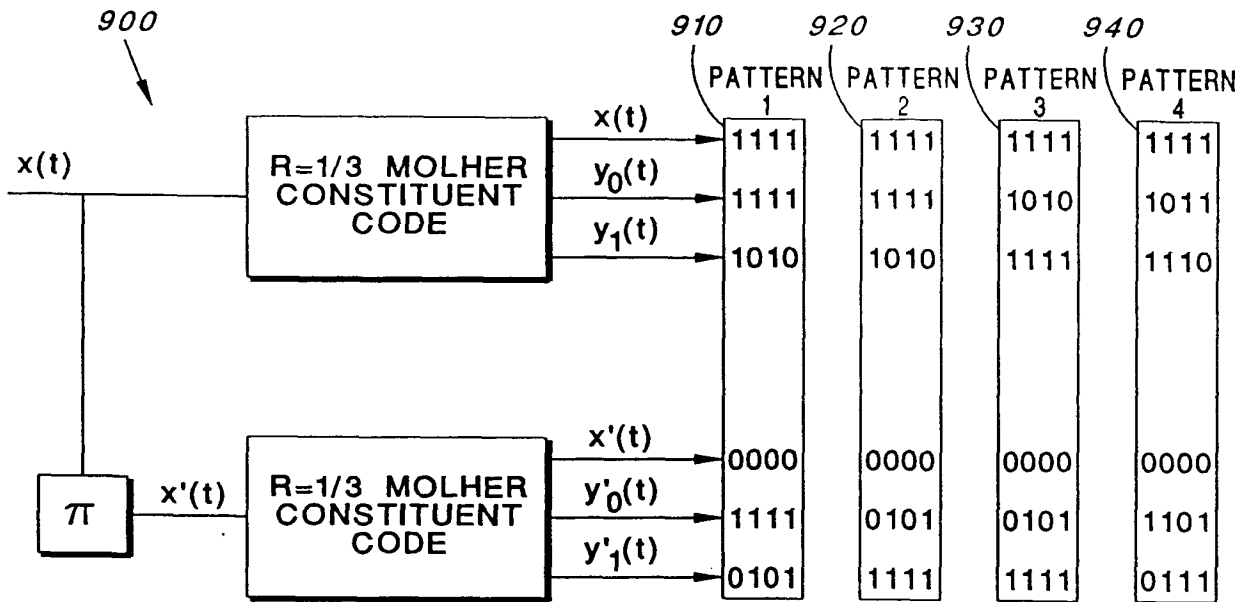


FIG. 9 PUNCTURING SCHEMES STUDIED FOR OPTIMIZING THE RATE 1/4 TURBO CODE

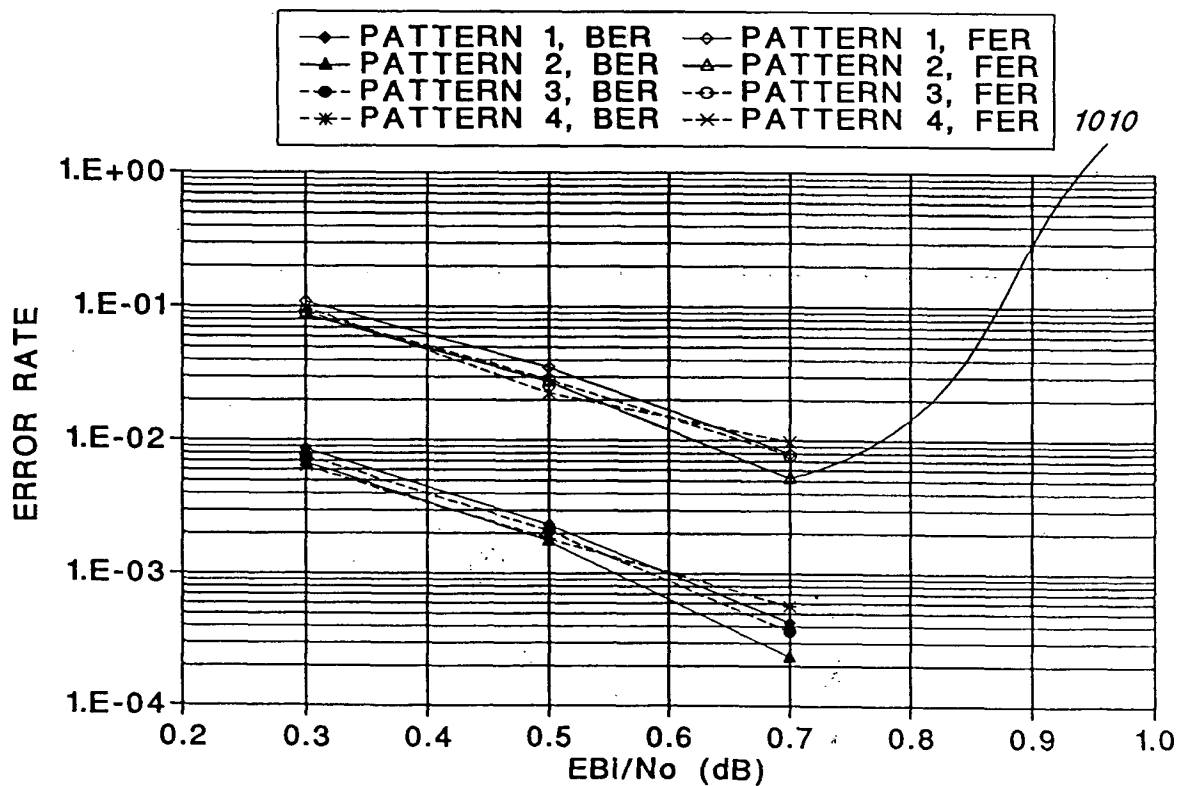


FIG. 10 PERFORMANCE OF CODE #1, FRAME SIZE=512

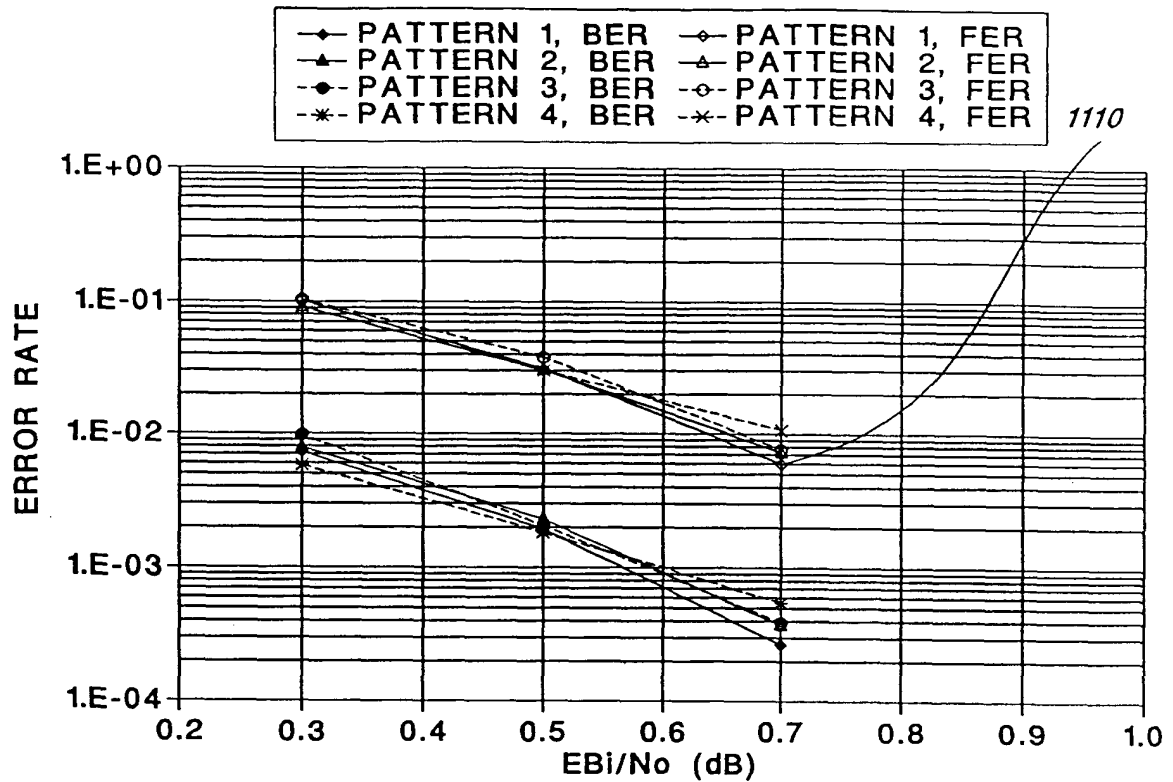


FIG. 11 PERFORMANCE OF CODE #2, FRAME SIZE=512

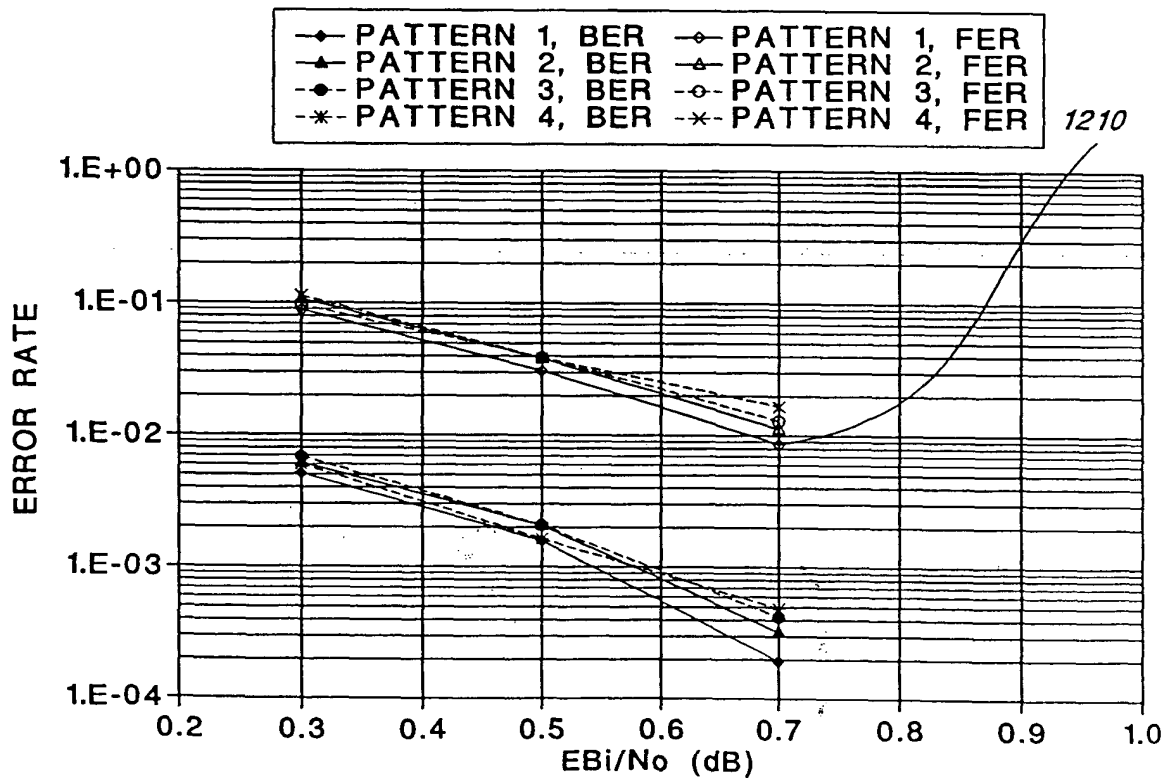


FIG. 12 PERFORMANCE OF CODE #3, FRAME SIZE=512

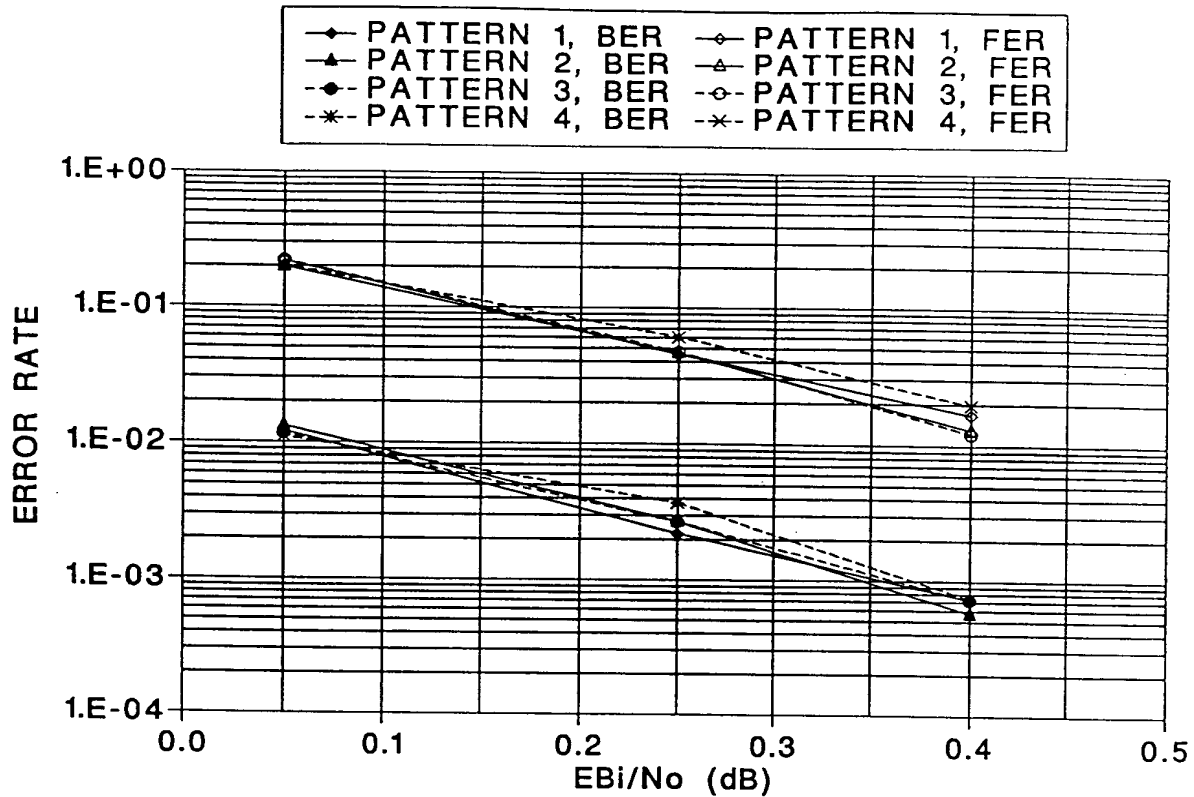


FIG. 13 BER/FER PERFORMANCE OF CODE #1, FRAME SIZE=1024

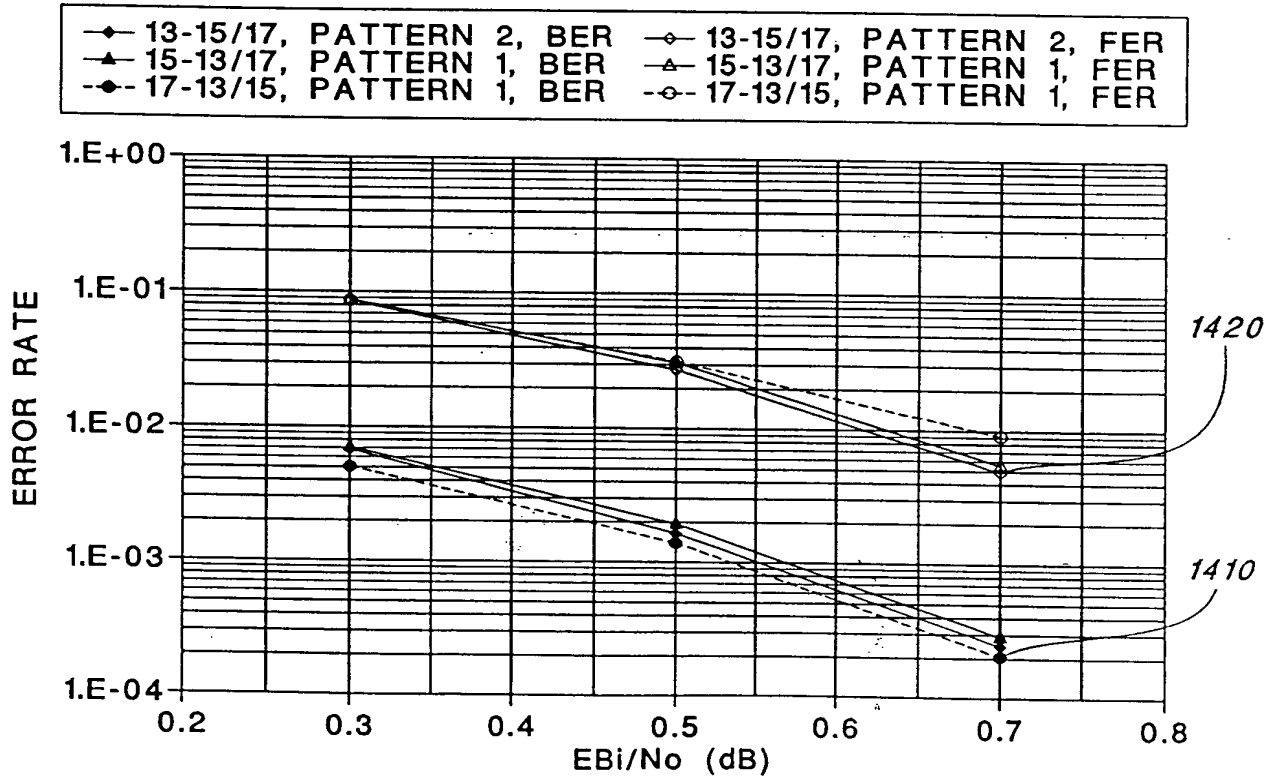


FIG. 14 BER/FER PERFORMANCE OF SELECTED RATE-1/4 TURBO CODES, FRAME SIZE=512

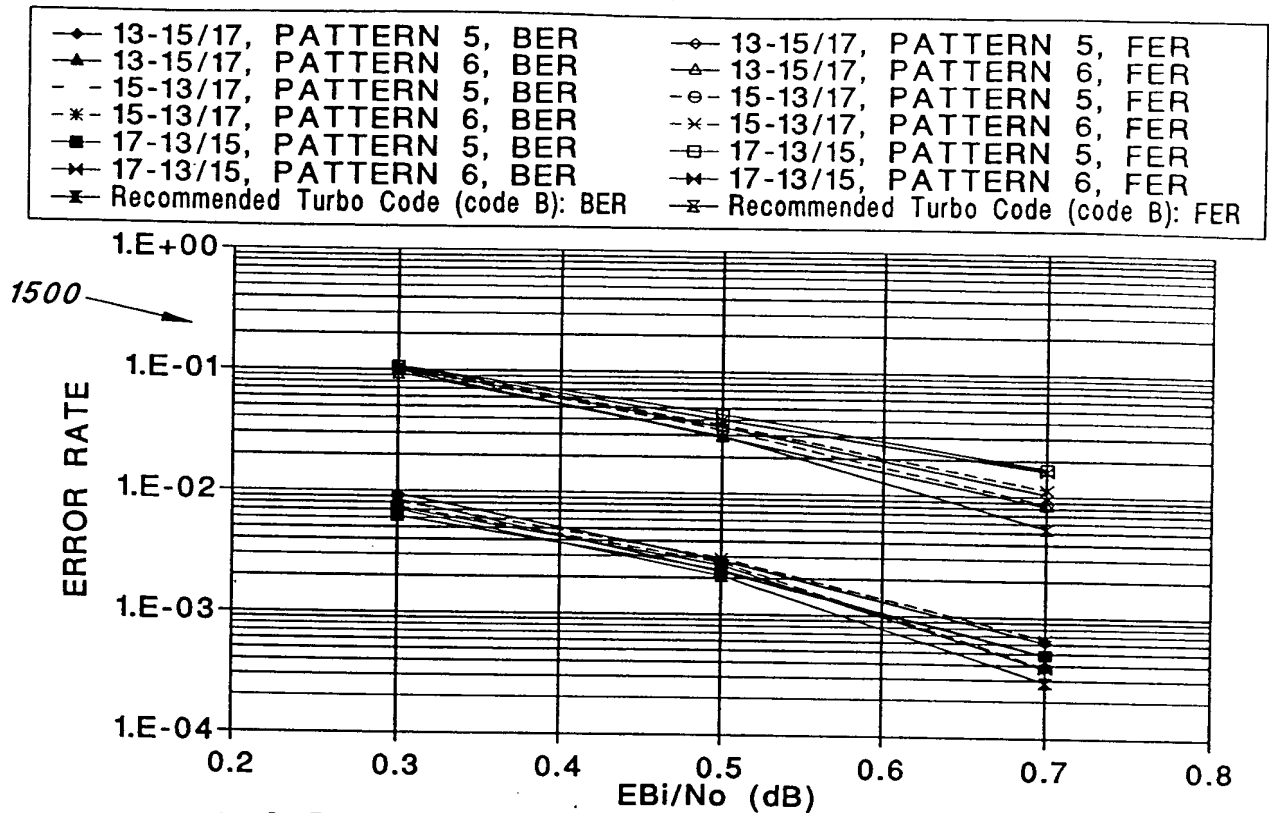


FIG. 15 COMPARISON AGAINST OTHER PUNCTURING SCHEMES, FRAME=512

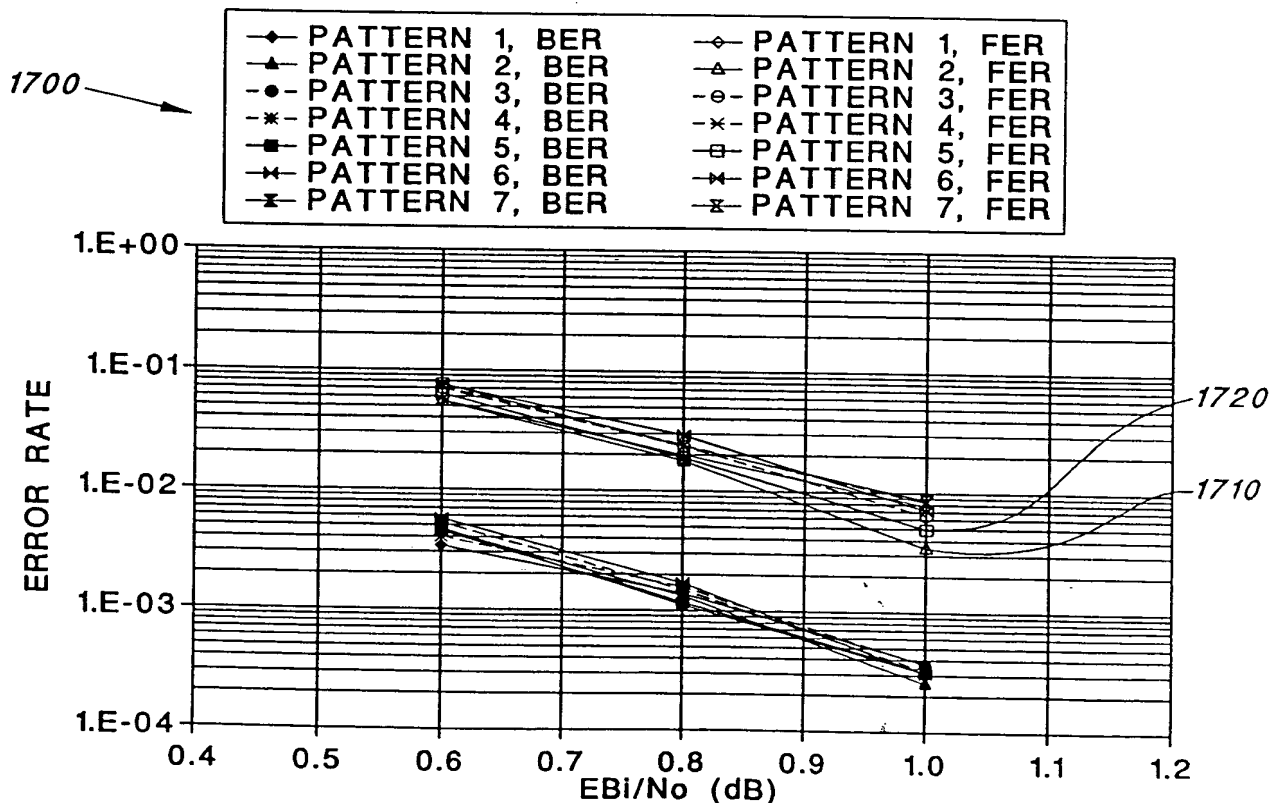


FIG. 17 COMPARISON OF RATE 1/3 PUNCTURING SCHEMES, FRAME=512

<u>1602</u>	<u>1604</u>	<u>1606</u>	<u>1608</u>	<u>1610</u>	<u>1612</u>	<u>1614</u>
PATTERN 1	PATTERN 2	PATTERN 3	PATTERN 4	PATTERN 5	PATTERN 6	PATTERN 7
1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
1 1 1 1	0 0 0 0	1 0 1 0	1 1 1 0	1 1 1 1	1 1 1 0	0 0 0 1
0 0 0 0	1 1 1 1	0 1 0 1	0 0 0 1	0 0 0 0	0 0 0 1	1 1 1 0
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
1 1 1 1	0 0 0 0	1 0 1 0	0 0 0 1	0 0 0 0	1 1 1 0	0 0 0 1
0 0 0 0	1 1 1 1	0 1 0 1	1 1 1 1	1 1 1 1	0 0 0 1	1 1 1 0

(a) TURBO CODE RATE = 1/3

<u>1640</u>	<u>1642</u>	<u>1644</u>	<u>1646</u>
PATTERN 1	PATTERN 2	PATTERN 3	PATTERN 4
1 1 1 1	1 1 1 1	1 1 1 1	1 1 1 1
1 0 1 0	0 0 0 0	1 0 0 0	1 0 1 0
0 0 0 0	1 0 1 0	0 0 1 0	0 0 0 0
0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
0 1 0 1	0 0 0 0	0 0 0 1	0 0 0 0
0 0 0 0	0 1 0 1	0 1 0 0	0 1 0 1

(b) TURBO CODE RATE = 1/2

FIG. 16 ESSENTIAL PUNCTURING PATTERNS FOR RATE 1/3 CONSTITUENT CODES

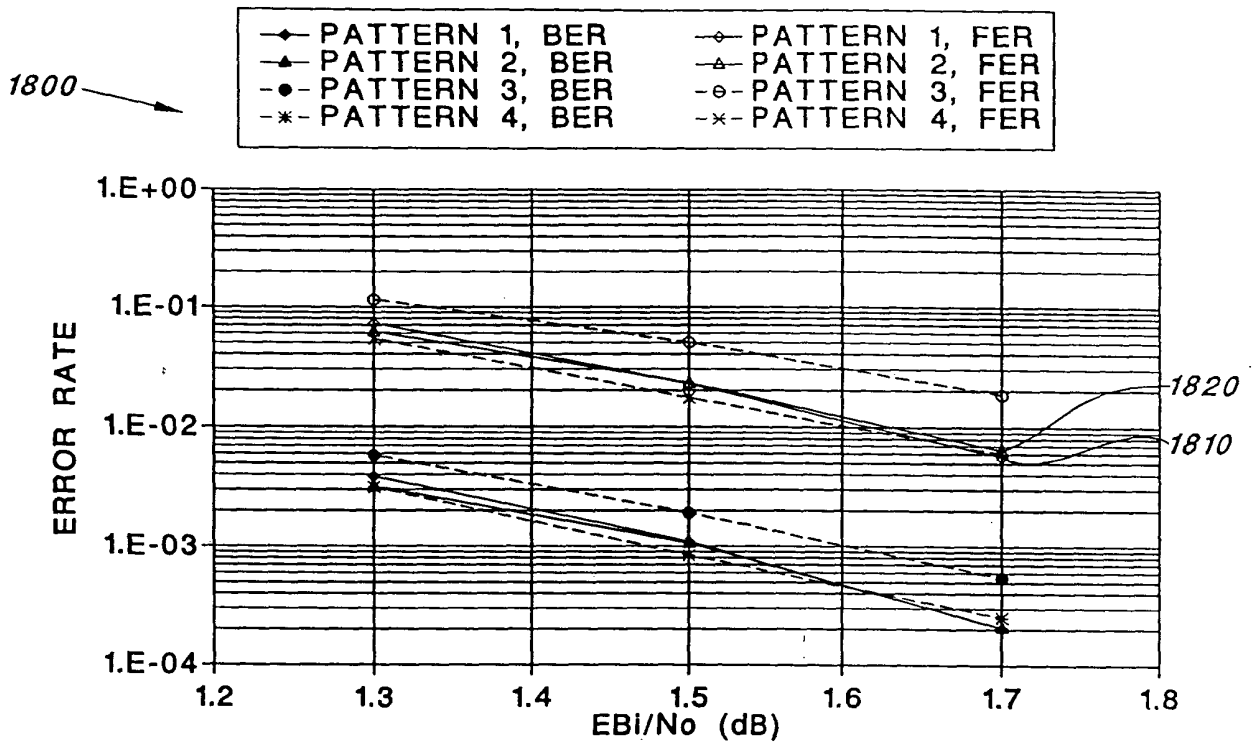


FIG. 18 RATE 1/2 PUNCTURING COMPARISON, FRAME=512

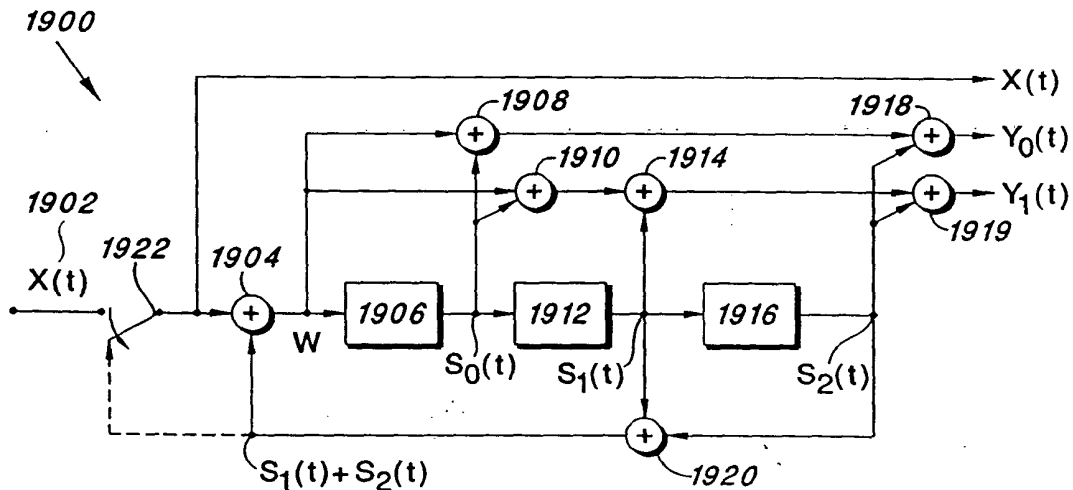


FIG. 19 UNIVERSAL CONSTITUENT ENCODER
RECOMMENDED FOR FORWARD LINK TURBO
CODES OF VARYING INTERLEAVER DEPTH

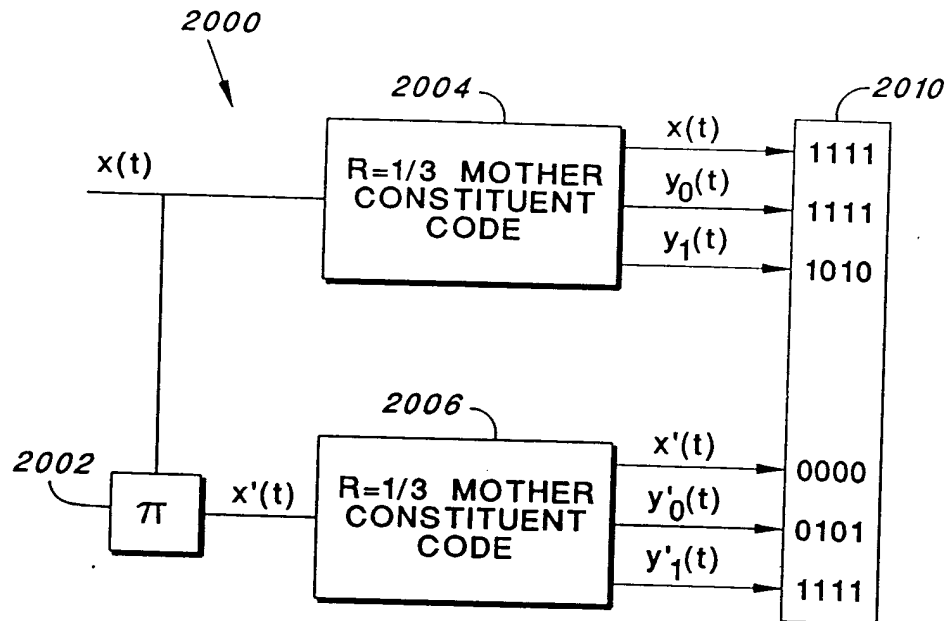


FIG. 20 FORWARD LINK TURBO CODE OF RATE 1/4
(MOTHER CODE IN FIGURE 19)

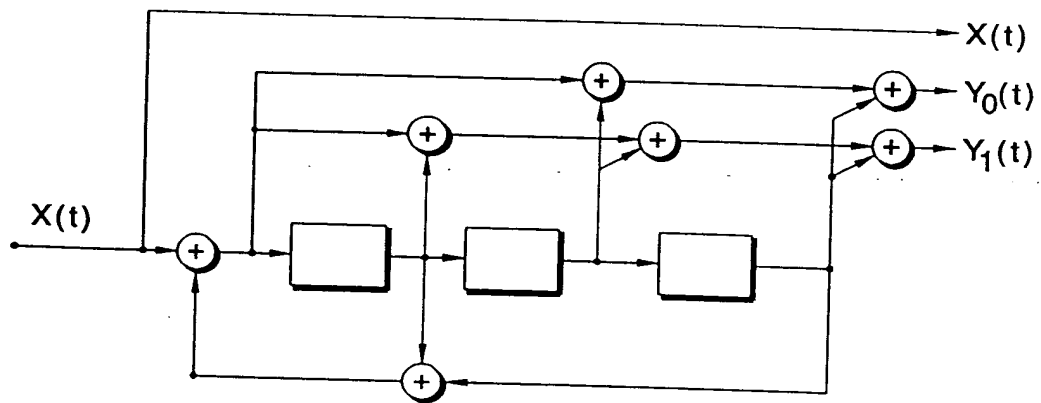


FIG. 25 CONSTITUENT ENCODER FOR
REVERSE-LINK TURBO CODE

PATTERN 1	PATTERN 2
111	111111
111	111110
000	000000
000	000000
110	110111
000	000000

PUNCTURING PATTERNS
FOR RATE 3/8 FORWARD
LINK CODES

FIG. 21

PATTERN 1	PATTERN 2
1111	11111111
1101	11011010
0000	00000000
0000	00000000
1010	10101101
0000	00000000

PUNCTURING PATTERNS
FOR RATE 4/9 FORWARD
LINK CODES

FIG. 23

PATTERN 1	PATTERN 2	PATTERN 3
1111	1111	1111
1111	1011	1111
1011	1111	1011
0000	0000	0000
1111	1110	1110
1110	1111	1111

PUNCTURING PATTERNS FOR RATE 2/9 REVERSE LINK CODES

FIG. 27

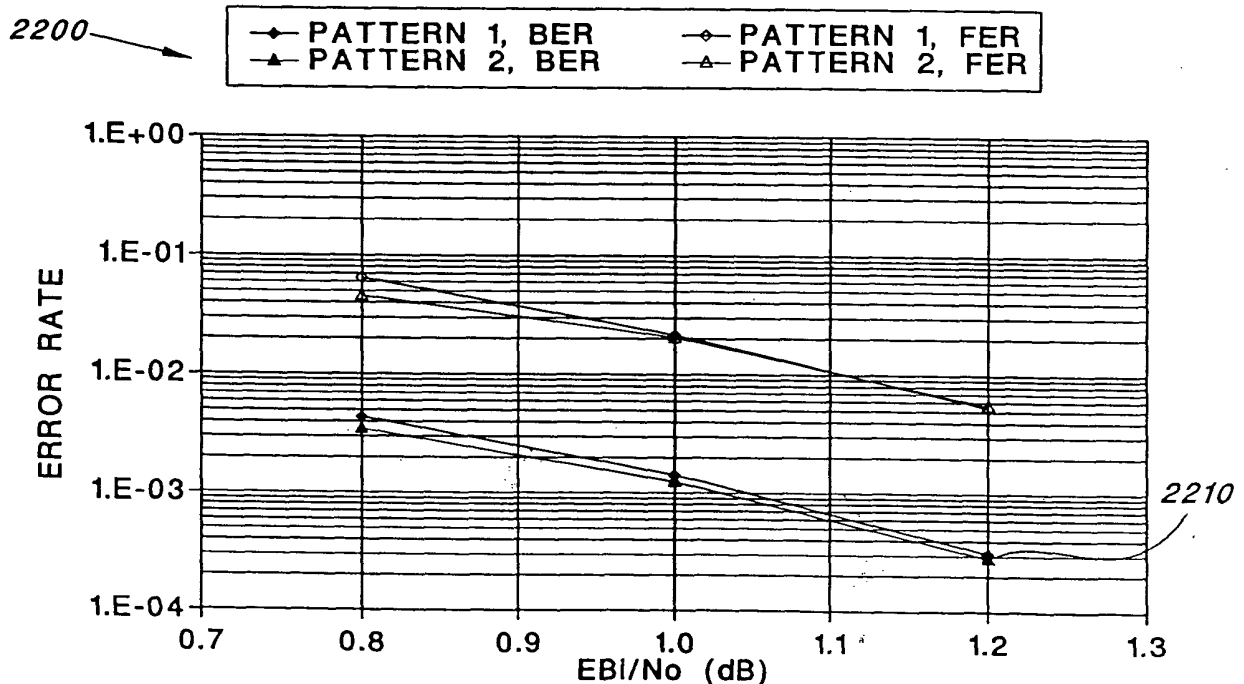


FIG. 22 RATE 3/8 FORWARD LINK TURBO CODES,
FRAME=512, AWGN CHANNEL

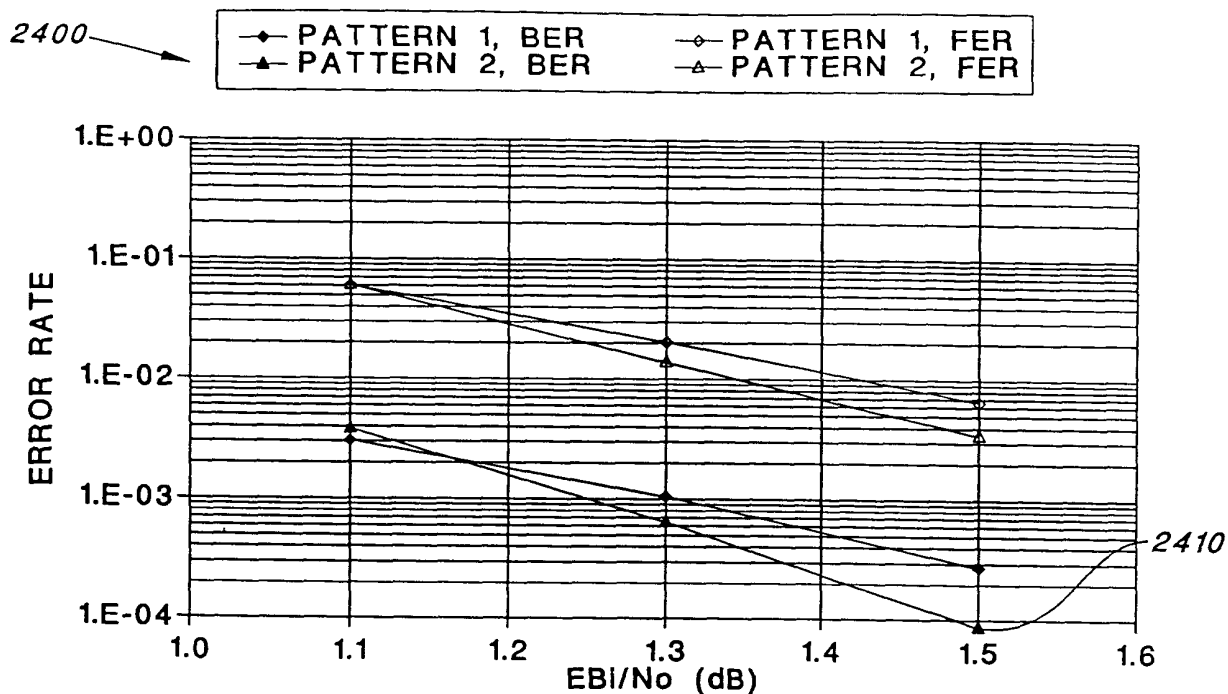


FIG. 24 RATE 4/9 FORWARD LINK TURBO CODES, FRAME=512, AWGN CHANNEL

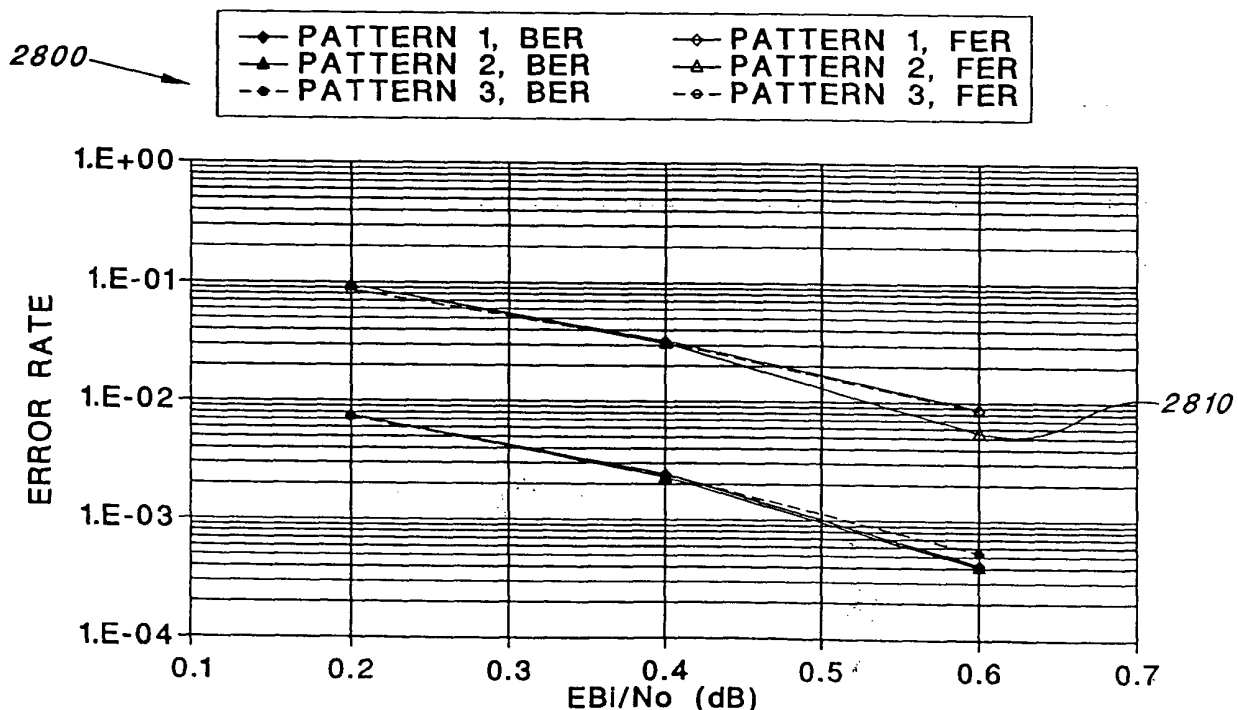


FIG. 28 RATE 2/9 REVERSE LINK TURBO CODES, FRAME=512, AWGN CHANNEL

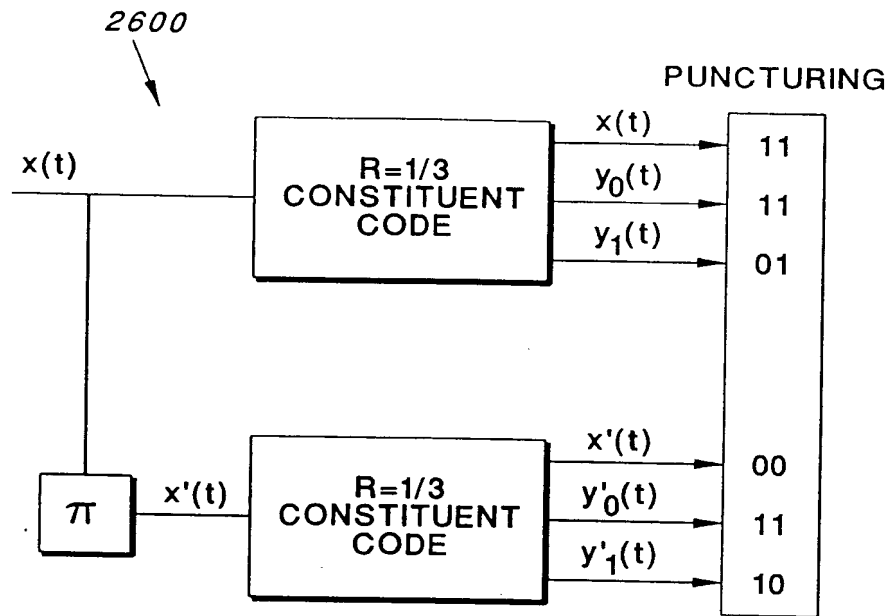


FIG. 26 REVERSE LINK TURBO CODE OF RATE 1/4
(MOTHER CODE IN FIGURE 25)

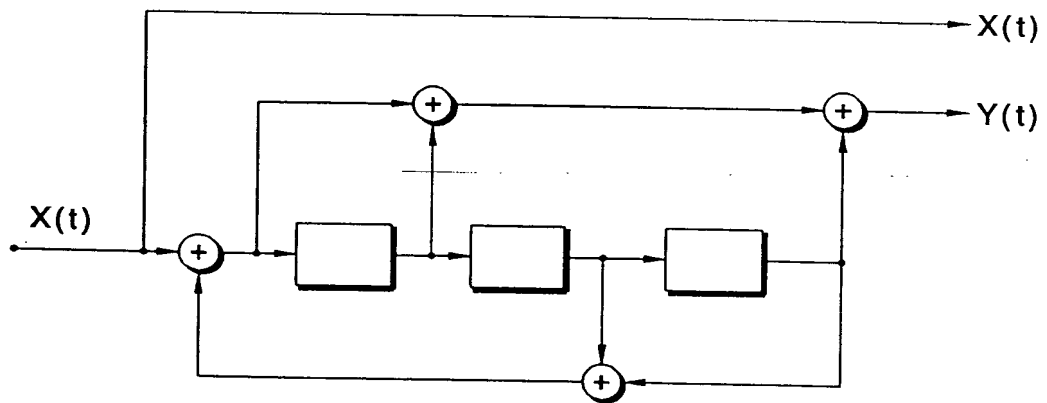


FIG. 31 UNIVERSAL CONSTITUENT ENCODER
RECOMMENDED FOR $R=1/2$ AND $R=1/3$ TURBO
CODES OF VARYING INTERLEAVER DEPTH

16/17		
PATTERN 1	PATTERN 2	PATTERN 3
111	111	111
111	110	110
000	001	001
000	000	000
110	110	010
000	000	100
PATTERN 4	PATTERN 5	PATTERN 6
111	111	111
100	100	000
011	011	111
000	000	000
010	000	000
100	110	110

INITIAL PUNCTURING PATTERNS
FOR RATE 3/8 REVERSE LINK CODES

FIG. 29

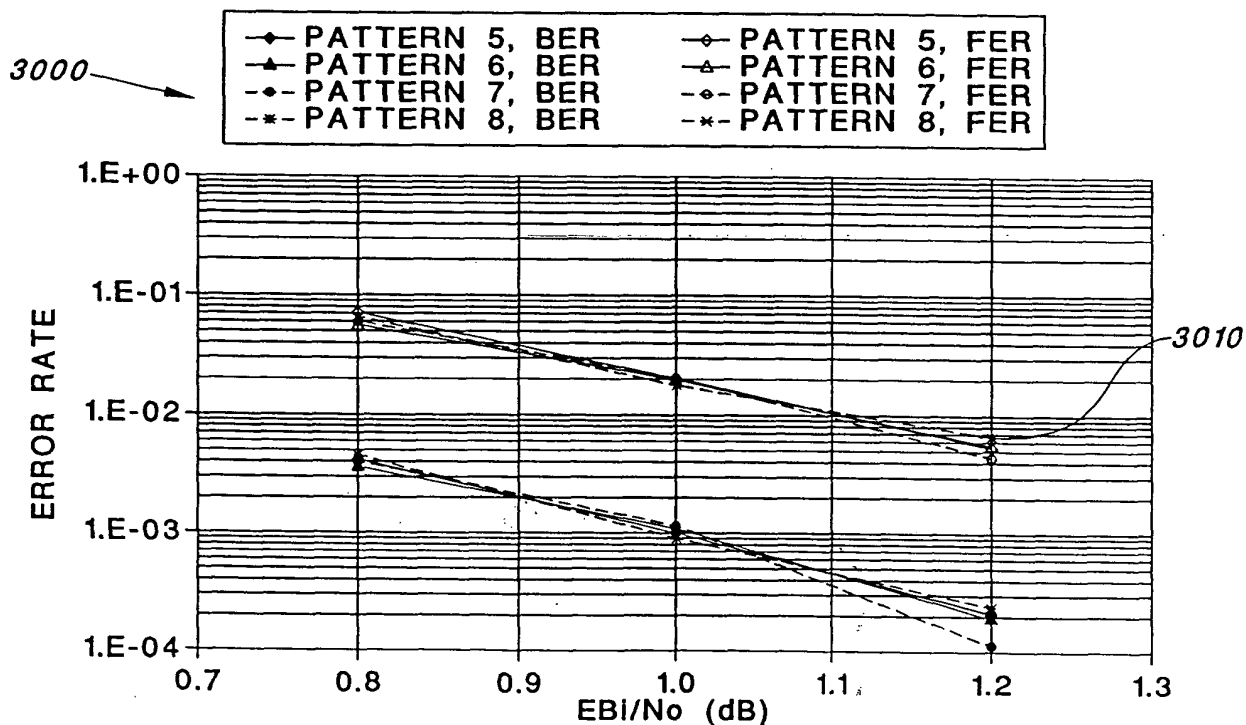


FIG. 30 RATE 3/8 REVERSE LINK TURBO CODES,
FRAME=512, AWGN CHANNEL

3200

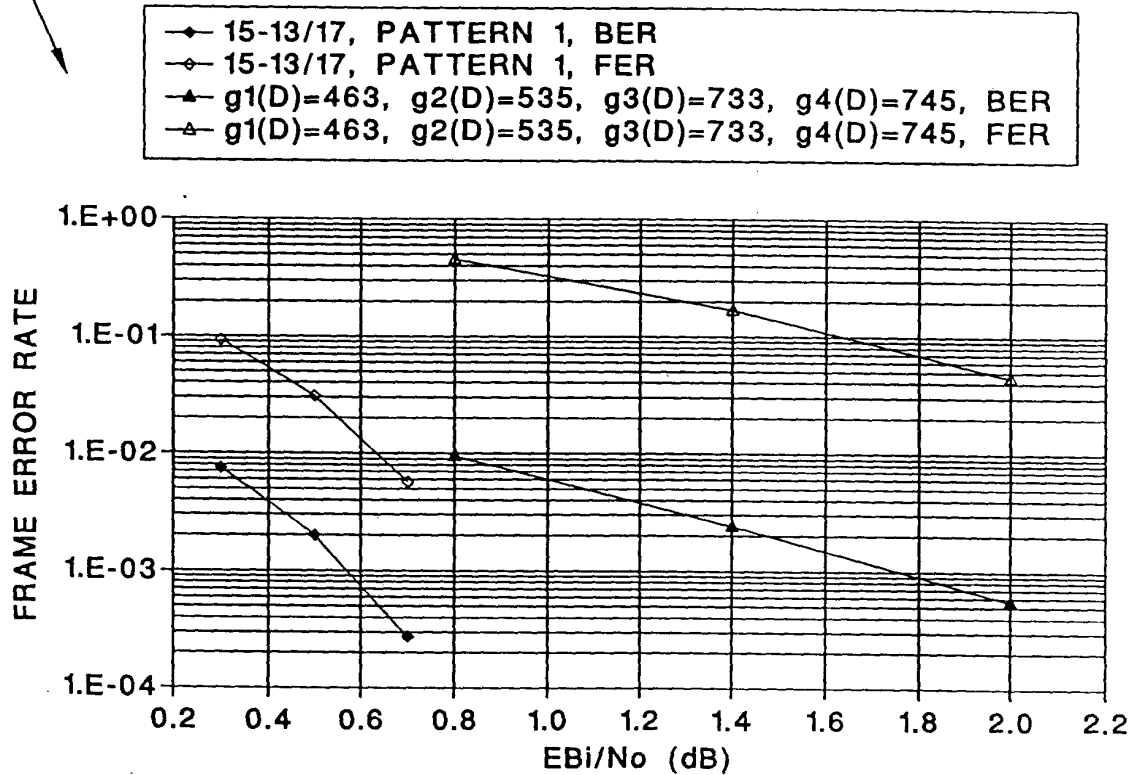


FIG. 32

COMPARISON OF RATE 1/4 FER-OPTIMIZED
TURBO CODE VS CONVOLUTIONAL CODE,
FRAME SIZE=512